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ABSTRACT

This document contains three papers on technology-enabled learning and human resource development. Among results found in "Current State of Technology-enabled Learning Programs in Select Federal Government Organizations: a Case Study of Ten Organizations" (Letitia A. Combs) are the following: the dominant delivery method is traditional instructor-led classroom learning; workforce size and distribution demands that technology-enabled media be incorporated into learning programs; and lack of organizational focus and budgeting results in piecemeal acquisition and implementation. "Technology-Based Training: A Review of the Theory and Literature" (Chemin Chu) presents an overview of technology-based training (TBT), including its underlying theories and contributions, as well as utilization recommendations for human resource professionals. "Recurrent Themes in E-learning: A Meta-Analysis of Major E-Learning Reports" (Consuelo L. Wright, Pedro A Willging, Tim L. Wentling) presents the meta-analyses of several reports written by government, business, and professional organizations about online learning. Among the revelations of the content analysis were the following: information transmission is the main purpose of e-learning; common features were immediacy of access, convenience and learner diversity; and the most common themes were lifelong learning, desire for computer literacy and skill, and response to globalization. The second and third papers contain substantial bibliographies. (AJ)

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Current State of Technology-enabled Learning Programs in Select Federal Government Organizations: A Case Study of Ten Organizations

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Recent advances in technology coupled with the need to provide cost-effective, timely learning to a large distributed workforce has encouraged federal government organizations to adopt technology-enabled methods for learning delivery. This case study research investigated the current state of technology-enabled learning programs in ten of those federal government organizations.

Keywords: Technology, Workforce Development, Distance Learning

The delivery of learning to a large distributed workforce is a challenge faced by private and public institutions alike. Perhaps nowhere is this challenge more obvious than in the United States federal government. According the to Bureau of Labor Statistics, the federal government is the largest employer in the country. In addition, while most agencies are based in the Washington, DC area, eighty percent of federal employees work in other localities (*Guide to Industries*, 2001).

One way to provide cost-effective, timely learning to such a diversified workforce is through the use of learning technologies that extend beyond traditional classroom instruction. For the purposes of this study, this overall approach will be referred to as technology-enabled learning.

President Clinton (1999) encouraged such an endeavor through Executive Order 13111 which stated that: "A coordinated federal effort is needed to provide flexible training opportunities to employees and to explore how federal training programs, initiatives and policies can better support lifelong learning through the use of learning technology." This directive was reinforced in provisions of the Clinger-Cohen Act and Raines Rules.

Many federal organizations in all three branches of the government have followed the intent of these directives and have instituted a variety of technology-enabled systems to deliver learning to employees. While the specific motives, implementation strategies, technologies and uses of those systems differ among agencies; the need to deliver rapidly changing knowledge in the most efficient manner possible is consistent throughout the government.

This need mirrors the requirements of other organizations. In their 2001 study, Strazzo and Wentling investigated the e-learning practices of selected Fortune 100 companies. They found that, in the large companies they surveyed, the move toward new learning technologies was motivated by a desire to provide immediate access to information while reducing travel and cancelled classes. Furthermore, they discovered that the companies were continually exploring how best to incorporate e-learning into their overall learning system and it was felt, by the companies, that e-learning use would be increasing and that it would be blended into their overall learning approach.

Similarly, James and Beattie (1996) found that organizations were using technology-enabled learning programs to contend with rapid enrollment growth. They also found that the organizations were using a blend of technologies to deliver programs and were careful in their adoption of technology-enabled learning programs. Cost and infrastructure requirements were two critical factors that contributed to the organizations' cautious approach.

A state of the industry survey conducted by Online Learning Magazine and International Data Corporation (Kiser, 2001) found that more than 80% of responding organizations were using some form of technology-enabled learning programs. One of the most important reasons cited for the use of these programs was convenience for employees and other learners, including customers and suppliers. Learners participated in a mix of courses, including user applications, regulatory training, management and business skills, and organizational orientation. As was the case in the previous studies, these organizations incorporated a variety of technologies into their overall learning approach.

Instructor led delivery was by far the most common method used. Other technologies were CD-ROM, videotape, interactive video teletraining (IVT) and web-based courses. The survey found that the use of technology-enabled learning programs was growing within the organizations but the issues of cost and lack of management buy-in were slowing the speed of adoption.

While government organizations do not face the competitive demands of private companies, they do need to quickly provide learning to a global workforce with a limited budget. The bottom line is to make federal employees more productive and provide improved service to the ultimate customers, the American taxpayers.

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Problem Statement and Research Questions

This research builds on the work of Strazzo and Wentling (2001). The particular problem of this research was to assess the current state of technology-enabled learning programs within select federal government organizations. Four research questions provided the structure for the study. Those questions were 1) What are the current learning requirements of the organizations? 2) What media are currently being used to deliver that learning? 3) What information technology and learning delivery technology infrastructure exists in the organizations? 4) What organizational and financial support do technology-enabled learning programs have within the organizations?

Contribution to Knowledge in HRD

Delivery of learning is moving away from a completely classroom-based structure. Public and private sector organizations alike are exploring how to use technologies to provide learning in ways that will meet the needs of learners and support organizational goals while, at the same time, being cost effective and responsive to change. This study is an examination of how such learning programs are being created and implemented within ten federal government organizations.

Methodology

Information about ten United States government organizations is included in this case study. All organizations have a nationally or globally distributed workforce and each organization is either developing or implementing technology-enabled learning programs for employee education. Participating organizations included components of the military, the federal judiciary, and the Departments of Defense, Treasury, Justice, Labor and State.

Between 1998 and 2001, each of the ten organizations conducted a baseline assessment of their learning program. Those assessments were conducted by teams of consultants and organization staff members. Each assessment was tailored to meet the needs of the organization for which assessment was conducted. However, all of the assessments examined the following current-state items:

1. Purpose of learning within the organization;
2. Description of the state of learning programs within the organization;
3. Description of the business structure of learning programs within the organization;
4. Description of the financial status of learning within the organization; and
5. Description of the existing technology infrastructure of the organization.

Each of the assessments was undertaken to identify the current state and recommended future direction for learning in the organization. The overall approach employed for the assessments consisted of a review of existing organizational documentation on the learning program, examination of the goals and objectives of the organization regarding learning in general and technology-enabled learning in particular and surveys and interviews with staff and stakeholders about the current state of learning within the organization.

The ten baseline assessments were analyzed for this multi-organization case study. The unpublished assessment reports are individually confidential. However, they were made available for case study review and analysis to identify the current state of technology-enabled learning in the ten organizations. Descriptions of the current state of the organizations and their learning programs were evaluated in detail. Further information about the current state of the learning programs was obtained from follow-up reports and direct observation of the identified government organizations.

Results and Findings

Scope of the Learning Mission

The ten organizations studied are responsible for the professional education of thousands of workers located throughout the world. In 1998, one organization trained 365,000 individuals in 699 courses, 17 seminars and 43 grants programs. Another organization holds 24,000 classes each year for 400,000 students. That organization has a training travel budget of $40 million. A third organization is limited to offering only entry-level instruction at its training academy because staff, classroom and residential restrictions limit enrollment to 88,000 student weeks a year.

Despite the size of their learning efforts, these organizations have education needs that exceed their current capacity. For example, the first organization has been tasked with adding training for state government and private sector staff its existing effort and experienced staff in the third organization are not receiving necessary continuing education because of space restrictions at the academy.

Providing learning for a large, geographically disperse population is both expensive and problematic. One organization, whose instructional program is almost completely multi-week classroom education, has a travel budget of $1000 per week plus airfare for each student. And, while production is a primary goal of the organization, no monetary estimate is made for time away from the job. Other organizations must provide learning to a global workforce despite technology infrastructure limitations in the field and in remote countries.

Current Learning Requirements of the Organizations

Most of the organizations studied primarily provide technical job-related instruction to a dispersed body of workers. Little administrative or clerical instruction is provided within the ten organizations. Likewise, management and leadership classes are usually received elsewhere. Both staff and policymakers expressed a need for organization-specific knowledge in those areas.

In most of the organizations, specific learning requirements originate from the organization's business units. However three of the organizations base their learning requirements on staff training plans and formal curriculum reviews.

Beyond instruction, each of the organizations has a need to deliver new and changing knowledge to workers in an efficient manner. Many of the participating organizations are using technology-enabled media to communicate that knowledge in a consistent, timely manner.

One organization includes learning in its overall strategic plan. According to that plan, learning should be designed in order to retain workers and to improve effectiveness, productivity and knowledge sharing across business units. The key performance goal for learning is just-in-time knowledge.

Media Currently Used to Deliver Learning

The principal medium currently employed to deliver learning in all the organizations is classroom-based, instructor-led teaching. Eighty to 95% of all courses are delivered in this format. Courses may be delivered entirely in the classroom or may include work simulation components. Classes of a few hours to 18 weeks in length are typically conducted in organizational academies. These learning centers are found in sites across the country. Many are in the Washington, DC area but others are situated in locations such as suburban Chicago, Georgia, Washington state, and New Mexico. Instructors also travel to local sites to deliver instruction.

Two organizations have prescribed on-the-job learning and mentoring programs that supplement classroom instruction. Learners must complete a portion of a mentoring program before attending an instructor-led class. Additional on-the-job learning and mentoring occur after the class is completed.

Seven of the organizations also deliver instructor-led classes via IVT. IVT is a one-way video, two-way audio medium broadcast via satellite. Three of the organizations have on-site studios and production staff to design and deliver instruction on a regular, scheduled basis. Two other organizations have on-site uplink capability but use classrooms instead of studios and broadcast classes on an as-needed basis. The other organizations utilize the studio and uplink facilities of other government agencies, when required.

The military organization uses paper-based correspondence to deliver a large number of courses. Because of limited access to other technologies in the field, it is expected that this medium will continue to be a primary delivery method for off-site instruction. Materials for several of the paper-based courses are being converted to PDF format and will be available on-line for those students with computer access.

Video teleconferencing (VTC), a two-way video, two-way audio medium, is used by six of the organizations for instructional delivery. Two of the organizations have formal VTC instructional programs to deliver teaching from universities to locations throughout the country. The other organizations use VTC for periodic instruction.

One organization is beginning to utilize custom-designed web-based instruction. The instruction will be used for prerequisite and entry-level material and, therefore, will supplement, rather than replace, classroom teaching. Another organization develops custom-designed CD-ROMs for the delivery several courses.

Two organizations offer commercial off-the-shelf (COTS) courseware on their Intranet sites. One of those organizations offers more than 600 COTS courses to learners. Another organization supports a global workforce by distributing several hundred courses from a library of 2700 CD-ROMs. Yet another distributes videotape courses to a worldwide group of learners.

Three organizations are developing learning portals as a way to consolidate COTS courseware, professional information, course catalogs, on-line forms and procedures and other professional resources. The learning portals will be located on the organizations' Intranet sites.

One organization is developing web-accessible courses on Blackboard. The courses are being used in both a stand-alone fashion and to provide in-depth instruction following introductory IVT broadcasts.

Each organization uses a blend of technologies to deliver instruction. The technologies selected are different for each organization. Some factors indicated for selecting technologies include organizational culture, existing infrastructure and custom or off-the-shelf learning needs. The following table summarizes the media used by the organizations to deliver instruction.

Table 1. *Blends of Technologies Used by the Organizations*

Organization	Traditional and Technology-Enabled Media Used
A	Instructor-led learning including simulation exercises, VTC, IVT, Custom-designed web-based instruction
B	Instructor-led learning, IVT, COTS, Job Aids, Learning Portal
C	Instructor-led learning, On-the Job mentoring and training, Learning Portal
D	Instructor-led learning, COTS CD-ROMs, IVT and VTC in domestic locations, Intranet-based COTS courseware
E	Instructor-led learning including simulation exercises, Videotapes, COTS CD-ROMs, IVT, VTC, Web-based COTS courseware
F	Instructor- led learning, On-the Job mentoring and training
G	Instructor-led learning, IVT, VTC, Custom-designed CD-ROMs, Blackboard
H	Instructor-led learning, IVT, Learning Portal
I	Instructor-led learning, Paper-based correspondence courses, PDF correspondence courses, Job aids, VTC
J	Instructor-led learning including simulation exercises, VTC, IVT, COTS CD-ROMs, Intranet based COTS courseware

Information Technology and Learning Delivery Technology Infrastructure Within the Organizations

All of the organizations studied have one or more central locations for the delivery of classroom-based instruction. These academies house classrooms, VTC and IVT facilities, computer laboratories and simulation areas. Other IVT and VTC classrooms are located in area or regional offices. VTC and IVT access is also available at college and National Guard sites.

The computer infrastructure needed to facilitate many technology-enabled learning media is similar among the organizations. Except when located in remote areas, most learners have at least Pentium class desktop or laptop computers with Windows operating systems and Internet and Intranet access. These computers have a range of processor speeds and memory. Most have CD-ROM drives and sound cards. Speakers may or may not be part of each computer system. Adequate bandwidth is available in most domestic and foreign locations. However, locations in many African nations and in parts of Asia have effectively no connectivity.

Workers in the organizations routinely use computers in the jobs. Staff in one organization estimated that as many as 90% of personnel have computer and internet access while a survey of learners in another organization found that 85% of the respondents have access to a computer for their job between 20 and 40 hours per week. Ninety-one percent of the respondents in the same survey indicated that they are at least somewhat comfortable using both a computer and the Internet. Almost all indicated that they would like to receive some form of technology-enabled learning. Fifty percent had no apprehensions about e-learning. However 35% were concerned about a possible lack of interaction with an instructor and class.

Organizational and Financial Support for Technology-enabled Learning Programs

One organization has been directed to create a distance-learning center with the mission to "design, develop, implement and evaluate effective and efficient technology-enabled solutions in support of and in collaboration with, sponsors of that organization's training and education programs." Activity to create this center is currently underway. Another organization states in its strategic plan, that "training should be developed and delivered in the most effective manner through the establishment of a distributed learning capability and curriculum." A third

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organization has committed to a goal of have 30% of instruction to be designed and developed for computer based and interactive multi-media delivery systems in two years.

Another organization is actively pursuing utilization of a variety of technology-enabled approaches to learning. The organization has a director of distance learning who has equal status with a director of classroom learning. The organization has a schedule of IVT broadcasts. At least one "live" program is broadcast each week. Taped programs are aired throughout the workweek. Customized CD-ROMs have been developed on a number of subjects. COTS courses are available on the organization's Intranet site and Blackboard courses are offered as requested.

Other organizations are experiencing less support for the use of technology-enabled learning. For example, one organization recently added video broadcasting capability to all classrooms in its academy. However, only one broadcast was delivered in FY 2001. The equipment has been used for video meetings, broadcasts to the desktop within the academy itself and as enhancements to the classroom instruction.

Most of the organizations have no focused budget for technology-enabled learning programs and no specified structure for implementing new learning media. Typically, responsibility for learning is dispersed within the organization and few internal staff are available to design technology-enabled programs. Instructional staff are tasked with delivering content rather than designing programs. Consultants are often used to design and/or develop technology-enabled courses.

Support for creation and implementation of technology-enabled learning programs has increased since the World Trade Center and Pentagon bombings on September 11, 2001. One organization experienced a 45-day travel moratorium thereby causing cancellation of many classroom courses and increasing the use of IVT and VTC facilities. Another was asked to be prepared to redesign all current classroom-based courses for delivery that would require no travel.

Summary

This study investigated the current state of technology-enabled learning programs in ten federal government organizations. The findings revealed that traditional instructor-led classroom learning is by far the dominant delivery method used by these organizations. However, in order to meet the needs of the workforce, each organization is incorporating more technology-enabled media in their learning programs.

As work becomes more complex, the need for professional education is growing rapidly. Providing classroom instruction on needed professional topics is beginning to tax the capabilities of instructors and facilities alike. In addition, classroom instruction cannot supply the just-in-time information that is often needed on the job.

Organizations are using technology-enabled media to expand the capabilities of the classrooms and instructors. For example, IVT and VTC courses are offered to multiple sites at once. This practice limits travel and allows more students to receive instructor-led learning at one time. Learning portals are also being developed. These portals will provide one location for workers to receive e-learning instruction, professional information and job aids such as forms and operating procedures.

The workforce of many federal government organizations is situated throughout the world. Providing instructor-led learning for remote workers is difficult and expensive at best. Technology-enabled learning programs are being used to meet the needs of those workers. Individuals located in cosmopolitan locations can receive IVT, VTC or elearning instruction while workers located in areas with limited connectivity can receive paper-based correspondence courses, videotape or CD-ROM instruction.

Currently, instructor-led learning in most of the organizations studied is limited to technical subjects. However, the organizations also have needs for supervisory, managerial, administrative and clerical courses. The use of COTS courseware is allowing these organizations to expand the training subjects offered to workers. Placing COTS courses on learning portals along with job aids is providing needed just-in-time knowledge to segments of employees that were previously overlooked.

Strazzo and Wentling (2001) found that the Fortune 100 organizations in their study were investing up to 50% of their training budgets in elearning. The government organizations studied for this research are utilizing e learning to a more limited degree. Instead, emphasis is currently being placed on visual technologies such as IVT and VTC. Of those organizations that are developing elearning, only one is producing customized web-based instruction. Others are utilizing COTS courseware, designing portals to consolidate learning and performance-support materials, or designing instruction with templates such as Blackboard.

While the federal government organizations studied are using more technology-enabled learning programs each year, organizational structure and financing is sometimes limiting the speed with which new technologies are incorporated. Lack of organizational focus and budgeting for technology-enabled learning programs is forcing piecemeal acquisition and implementation of both hardware and courseware. Equipment varies among locations.

Technologies and course development vary among business groups and coordination of delivery is difficult because of the differences. Government-wide buying consortiums are allowing easier purchasing of technology items, but rigid budget structures and a lack of coordinated planning for technology-enabled instruction within organizations are resulting in disjointed approaches to design and implementation of programs.

Conclusions and Recommendations

Use of technology-enabled learning programs will continue to grow within the federal government. The need for learning is exceeding the current capacity of organizations to provide instruction using traditional methods. Organizations are being asked to provide learning for additional people and in added subject areas.

Such requirements cannot easily be met using traditional learning approaches within the conventional classroom infrastructure. They will require utilization of a variety of learning solutions. While instructor-led classroom teaching will continue to provide the foundation for education programs in the federal government, that foundation will be supplemented by a variety of technology-enabled media.

E-learning will be one component of a blended approach to learning delivery. E-learning will consist of some customized web or CD-ROM based instruction. It will also include COTS courseware and instructor-designed classes using products such as Blackboard. Learning portals are expected to be used to provide a central repository for e-learning and other professional resources.

Video technologies will continue to be important media for learning within the federal government. Federal organizations have the hardware infrastructure needed to broadcast and receive both IVT and VTC programs. Currently, programs are most often received in a classroom setting. New technologies will allow desktop receipt of broadcasts.

While a baseline infrastructure of computer, video and traditional teaching capabilities exists, specific capabilities are varied among and within government organizations. Any new technology-enabled learning approach must take that variance into account. New programs must consider both the learning and technology needs of the audience and the organization.

Curricula must be flexible enough to accommodate a variety of media. Instructors and instructional designers must be able to create and deliver quality learning using methods other than traditional classroom instruction. Programs must have the capacity for ongoing and immediate changes in content and delivery. Materials must be available for just-in-time use by those who need them.

Change happens slowly in the federal government. Complex budget structures and bureaucratic organizations have been established to facilitate care and oversight. New initiatives that don't fit somewhere within traditional structures are difficult and time-consuming to implement. New learning technologies will be adopted though either priority action or by utilizing existing structures for implementation.

The organizations that participated in this study have the capacity to incorporate more technology-enabled learning into their programs. Successful blending of learning solutions will be realized when workers in those organizations can receive instruction or information when they need it, where they need it, in a form that is useful to them.

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Technology-Based Training: A Review of the Theory and Literature

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The purpose of this review is to explore technology-based training (TBT), which is one of the future trends of training delivery. Included in this review are the definitions, benefits, and limitations of TBT; learning theories applied to TBT; contributions of TBT; and recommendations to Human Resource Development professionals for TBT utilization.

Keywords: Technology-Based Training (TBT), Andragogical Model, Events of Instruction

Many industries—particularly those with higher than usual employee turnover—use technology-based training (TBT) for employee orientation because training costs can be significantly reduced (Greinsing-Pophal, 1998). In addition to primary job training, TBT also provides cross-training in non-primary job functions, thereby reducing costly employee turnover and improving employee morale and quality of work (Cavanagh, 1993). Both corporations and universities are currently developing TBT systems; specifically, IBM has built an approach that measures the monetary benefits of the TBT for thousands of employees, and the University of Illinois at Urbana-Champaign has created an entire online learning evaluation system (Buren, 2000).

A recent survey of training, human resource (HR) and information technology (IT) professionals found that 94 percent believe TBT to be a practical option for teaching professional development skills; 74 percent believe TBT will become the norm within five years; and 81 percent believe TBT provides a cost-effective alternative or supplement to classroom-based instruction (St-Amour, 2000). Further, investment in education has increased substantially as more demands are put on employees. Based on a 1998 survey conducted by *Training Magazine*, corporate spending on training has increased by 26 percent over the last five years. Additional research that investigated the types of instructional methods and media to deliver industry training found that, from 1999 to 2000, CD-ROM/computer-based training had increased 20 percent; Internet/www training had increased 15 percent; and intranet/organizational internal network training had increased more than 26 percent (Staff, 1999, 2000). As TBT continues to gain credibility as a cost-effective means through which to deliver training, undoubtedly more and more companies will encourage employee participation. Industry estimates predict that by 2003, no less than 30 percent of all training will be delivered over corporate intranets (Ryan, 2001).

Problem Statement and Research Question

Obviously, TBT is not only a trendy training approach for all industries, it is also gaining popularity at various academic institutions. Despite its reception, however, TBT also has limitations. This paper is focused on an issue of particular importance to the human resource development (HRD) field: how practitioners can most effectively maximize TBT's strengths for employee training. Therefore, the purpose of this study is to discuss current literature related to TBT and that literature's implications to HRD practice. In order to answer the problem statement and understand how HRD practitioners can practice in a TBT project, this paper will explore the following questions: (a) What is TBT? (b) What are the benefits of TBT? (c) What are the limitations of TBT? (d) What are the roles and responsibilities of HRD practitioner in TBT projects? (e) How can HRD practitioners take full advantages of TBT's strengths to ensure success?

These five questions will answer the research question: What can HRD practitioners contribute to TBT?

Methodology

The methodology for this study is a conceptual analysis derived from a review of related TBT literature. In their book, *Technology-based training: The art and science of design, development, and delivery* (1999), Kruse and Keil discuss numerous TBT issues, including basic information, adult learning, instructional design, technology selection, interface design, and various phases of TBT project management. Further, the authors integrate other articles from various complementary fields (e.g., business and computer science) to analyze and synthesize theories and critiques of current TBT implementation. In addition to Kruse and Keil's book, many related journal and Internet articles

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were also selected as resources to answer these questions. Due to major development of TBT as web-based training and computer-based training, the author also searched those two keywords to locate articles. This paper will present and discuss the research questions, then formulate conclusions and make recommendations based on findings.

Results and Findings

The Definition of TBT

There are many terms associated with TBT, including technology-based learning, computer-based training (CBT), computer-based learning (CBL), computer-based instruction (CBI), computer-based education (CBE), web-based training (WBT), Internet-based training (IBT), intranet-based training (IBT), browser-based training (BBT), distance learning, desktop training, desktop video conferencing, interactive training, and computer-assisted instruction (Hall, 1997; Kruse & Keil, 1999). In general, TBT is no more complicated than an effective use of technology to deliver training and educational materials; TBT is the all-inclusive term for training delivered by various methods. In the past, such methods have included the use of mainframe computers, floppy diskettes, multimedia compact disks, read-only memory (CD-ROM), and interactive videodisks. Most recently, training delivery via Internet and intranet have become preferred options (Kruse & Keil, 1999). Cavanagh (1993) further described this type of training delivery:

> [TBT] includes a wide variety of video and computer-based training products. TBT allows experts to capture their knowledge of a particular area and deliver it to students in a format that facilitates learning and retention. Also, TBT may be repeated at no charge and delivered more cost-effectively than traditional instructor-led training (p. 31).

St-Amour (2000) also provided a definition of TBT and discussed its growth and applicability:

> TBT -- the use of software, computers, the Internet, CD-ROM learning tools, video streaming and other technologies -- is growing at about 30 percent annually. TBT is increasingly being applied by organizations to provide professional development or soft skills, not just technical training, because the technologies can create realistic, highly-interactive, computer-based simulations (p. 13).

To conclude, TBT applies technologies—such as software, computers, the Internet, CD-ROM, and video streaming—to deliver and provide learners with the knowledge and skills required to complete a specific task or job for the purpose of increasing their capabilities to perform that task or job.

Benefits of TBT

Technology comprises the ideas and the machines that human beings develop to meet their needs. Therefore, applying technology in the workplace creates more convenient, more reliable, and more effective environments in order that people can work efficiently and productively. TBT has many advantages for both trainers and learners that can be developed rapidly and are accepted by most industries. Many researchers have listed advantages that are integrated into three points: convenience, reliability, and efficiency.

Convenience. The biggest benefit of TBT is saving time from traveling and waiting for training. There is very strong evidence that TBT requires less time for learner participation than instructor-led training (Hall, 1997, p. 108). Although the most common rates of time reduction are from 40-60 percent, some examples range from 20 percent to a high of 80 percent reduction of participant time.

Moreover, the learner can set up their own schedule and their learning pace from the TBT. As adult learners, TBT participants can schedule their technology-based training for virtually any location and time, conditions that are impossible with instructor-led training (Hall, 1997; Kruse & Keil, 1999; Ouellette, 1999). Learners also can reduce their own education-related stress and increase satisfaction of the training experience through TBT. Not only are employees who are trained using TBT able to acquire knowledge at their own pace, they can practice skills without feeling threatened or embarrassed (Galloway, 2000; St-Amour, 2000).

Reliability. TBT can create a safe learning environment for learners that allows them to practice tasks safely without the risks and costs associated with the real environment (Arkin, 1994). For example, computer-based simulations enable ambulance drivers and aircraft cabin staff to practice emergency procedures without endangering patients or passengers. Another reliability factor of TBT is its consistent delivery of training programs. TBT enables employers and HR professionals to ensure consistency of delivery as well as technology-based simulations for assessment purposes (Arkin, 1994; Kruse & Keil, 1999). Mumford (1998) also indicated that TBT is planned, structured and delivered through an extremely consistent process, and can be excellent at delivering knowledge .

Efficiency. First, TBT is cost-effective. Many costs can be reduced or eliminated altogether through TBT use (e.g., instructors' salaries, meeting-room rentals, learner travel and per diem, lodging, and meals). In addition, TBT can be implemented and accessed with minimum disruption to employees' typical work schedules, which may be the most positive result of this delivery method (Cavanagh, 1993; Galloway, 2000; Kruse & Keil, 1999; Moore, 1998). As an effective way to train individuals to operate virtually any piece of machinery, TBT is also generally cheaper than using real machines in a real work environment with real supervisor oversight (Arkin, 1994). Moreover, as world needs change, employees in all competitive domestic and global markets need to remain current with the increasing demand for more knowledgeable and skilled workers. Multiple sources suggest that TBT is one of the most effective ways through which employers can add substantial knowledge and skills to their workforce populations (Galloway, 2000; Moore, 1998).

Second, TBT is simple for employers to manage. TBT offers the ability of employer, trainer, and employee to track progress and measure results quickly and efficiently so that they are able to see the results of employee training immediately and effortlessly. As a result, TBT can increase employee's retention. Kruse & Keil (1999) specified that, on the average, TBT use increases employee retention rate by 25 percent over more traditional methods of training. The departure of TBT from traditional methods is one indication of employer willingness to provide for their employees' professional development. Since employees are more inclined to remain loyal to an organization that is committed to their on-going development (Galloway, 2000; Moore, 1998), use of TBT might also increase employee morale.

Third, TBT provides an interactive environment that enables user learning actively and effectively. TBT participants can download courses using a Web browser or participate in the courses interactively while they are connected to the Internet. Furthermore, chat rooms or discussion lists can provide a level of interaction among learners and even trainers (Hall, 1997; Kruse & Keil, 1999; Ouellette, 1999). Some learners, who may be reticent to participate in live class discussions, may also become more active in TBT settings than in instructor-led training.

Finally, TBT content is easy to update. TBT can be used to impart new knowledge and skills very quickly, which is a great benefit for all businesses in the current, fast-paced global economy (Hall, 1997; St-Amour, 2000).

Limitations of TBT

The limitations of TBT can be viewed from technology and learner perspectives. From the technology perspective, corporations need to invest great expense in equipment before they can implement TBT. Hefty capital investment costs pose a real barrier to greater use of TBT methods, especially those methods that involve computer-driven multimedia systems that combine sound, text, and graphics (Arkin, 1994). In addition, by using the Internet as the major delivery method of TBT, employers must also consider that employees may experience limited bandwidth with use of their personal home computers. This limitation means slower performance for sound, video, and even extensive graphics (Hall, 1997), especially when some employees still—slowly—browse the Web with 28.8K dial-up modems from those home computers. Obviously, such slow speed may reduce both the learning process itself and the effectiveness of TBT as a learning method. Fortunately, there are two keys to future TBT growth: (a) the dramatically increasing power of the industry-standard personal computer, and (b) the emergence of powerful storage and retrieval systems at reduced costs (Cook, 1992). Unfortunately, at present, it still takes more time and costs more money to develop TBT systems and programs (Hall, 1997; Kruse & Keil, 1999).

From a learner perspective, the major limitation of TBT is that some learners have technophobia, which may reduce the effectiveness of TBT, since decreasing instructor-led training may make those learners extremely uneasy (Hall, 1997; Kruse & Keil, 1999). Further, TBT is likely to be less effective than other methods in helping people to develop insights (Mumford, 1998). Many TBT programs are the focus of training and practice, which does not involve development of high-level cognitive skills such as problem solving. In addition, gaining knowledge of or skills in areas that involve complex physical-motor skills (e.g., component wiring) or emotional aspects (e.g., mediation) are also limited by TBT use (Hall, 1997; Kruse & Keil, 1999).

Even though limited bandwidth may be a problem for TBT implementation, due to rapid technological development, it may not be a problem in a few months or even weeks. Other limitations (e.g., high expense and learner technophobia) can also be controllable through needs assessment and analysis.

Roles and Responsibilities of a TBT Project

Kruse and Keil (1999) suggest that to create effective TBT requires myriad responsibilities and specialties from members of a project team. These team member roles include: (a) the client-sponsor, who acts on behalf of his or her organization to ensure TBT project creation and development, and is responsible for the success or failure of the

TBT; (b) the project manager, who ultimately guarantees on-time, on-budge delivery of a TBT solution, and is responsible to the client-sponsor for the quality of the finished product; (c) the subject matter expert (SME), who contributes the core content and original materials, is available for information collection through interviews, and is responsible for accuracy of the design documents, scripts, and final deliverable; (d) the instructional designer, who has background in instructional design, psychology, education, or multimedia technology, and conducts high-level analysis of performance-goals, target audiences, training needs, and technology limitations; (e) the writer, who creates and revises an outline and script which that dictate the words, images, video and audio elements presented to the audience, applies navigation direction to the scripts, and adds notes to indicate special functions, links, or other software behaviors; (f) the graphic artist, who creates screen layouts and interface items, such as bottoms, windows, menus, graphics and animations, from the blueprints created by the instructional designer and writer; (g) the programmer, who assembles different elements, such as text and animation, into a coherent whole, debugs the program following alpha and beta tests, creates databases, and constructs reporting mechanisms used for learner tracking; and (h) the quality reviewer, who works internally during development, alpha and beta stages, to check the program for quality and bugs, and creates change reports.

The practitioner is most likely an instructional designer who assesses training needs, designs documents, and takes charge of the formative and summative evaluations. Even though good TBT practitioners need a basic understanding of technology to know what is possible given certain technological realities, practitioners should possess the abilities Kruse and Keil (1999) cited as necessary for the best instructional designers: they quickly and accurately recognize the gap between performance and knowledge, and appreciate and apply a breadth of adult learning theories.

Gap Analysis – Performance Analysis Flow Diagram

The technique of gap analysis is used to analyze/assess current skill and knowledge and future expectations. A gap analysis is also referred to as a needs assessment or a needs analysis, which is a process by which an organization's HRD needs are identified and articulated (DeSimone, Werner, & Harris, 2002). The analysis phrase simply identifies the gap between actual behaviors and desired outcomes, and obtains information about the learner, environment, and technology that are relevant to closing the gap. Mager and Pike (1997) presented the Performance Analysis Flow Diagram (see Figure 1) to analyze performance problems. The flow diagram not only illustrates each of the steps in the procedure, but also identifies and resolves the problem as quickly as possible. Furthermore, it provides an easy method to communicate with insiders and outsiders without using jargon. Therefore, a Performance Analysis Flow Diagram is the top choice of practitioners to practice gap analysis.

Adult Learning Theories

HRD practitioners always refer to adult learning theories to develop training programs. To apply adult learning theories to TBT, practitioners make it more user-friendly and attractive to those learners who feel uneasy about getting training from technology. The andragogical model has stood for many years as a central model of adult learning. Knowles, Holton, and Swanson (1998) proposed an andragogical model (see Figure 2) in practice that contained six-core adult learning principles:

1) *The need to know.* Adults need to know why they need to learn something before undertaking to learn it. To apply TBT, the course should begin with an emphasis on the specific benefits of the topic, and objectives that learners can apply directly to their work.
2) *The learners' self-concept.* Adults have a self-concept of being responsible for their own decisions, for their own lives. Once they have arrived at that self-concept, they develop a deep psychological need to be seen by others and treated by others as being capable of self-direction. Palmer and Smith (1990) defined a self-directed learner as "a learner who can identify what they want to learn, can determine the resources necessary to learn it, and can evaluate themselves honestly to see what it is they have learned" (p. 82). If the learner does not take self-direction as their principle, TBT will succeed less than it expects. Therefore, the analysis phrase of TBT needs to take the prospective audience assessment into account.
3) *The role of learners' experience.* Adults come into an educational activity with both a greater volume and a different quality of experience from youth. Prior experience could be the resources and mental models through which they learn new knowledge through connection. When this principle is applied to TBT, questions that arise from previous work experience should be addressed and combined with the learners' previous experiences to find other approaches of problem-resolution for the future.

4) *Readiness to learn.* Adults typically become ready to learn those things they need to know and be able to do in order to cope effectively with their real-life situations. TBT could provide an interactive screen on which learners could click to obtain certain concepts and information from which they could effectively learn.
5) *Orientation to learning.* Adults are motivated to learn to the extent that they perceive that learning will help them perform tasks or deal with problems that they confront in their life situations. According to this principle, the TBT courses should be designed to access on-line information immediately so learners can look up the website and apply their learning immediately to their own situations.
6) *Motivation.* Adults tend to be more motivated toward learning that helps them solve problems in their lives or results in internal reward. Knowles, Holton, & Swanson (1998) indicated that motivators for adult learners are internal (e.g., self-esteem and quality of life) rather than external (e.g., better jobs and promotions). TBT could give practical examples of how to arrange each objective to motivate the to audience continue to learn.

Figure 1. Performance Analysis Flow Diagram

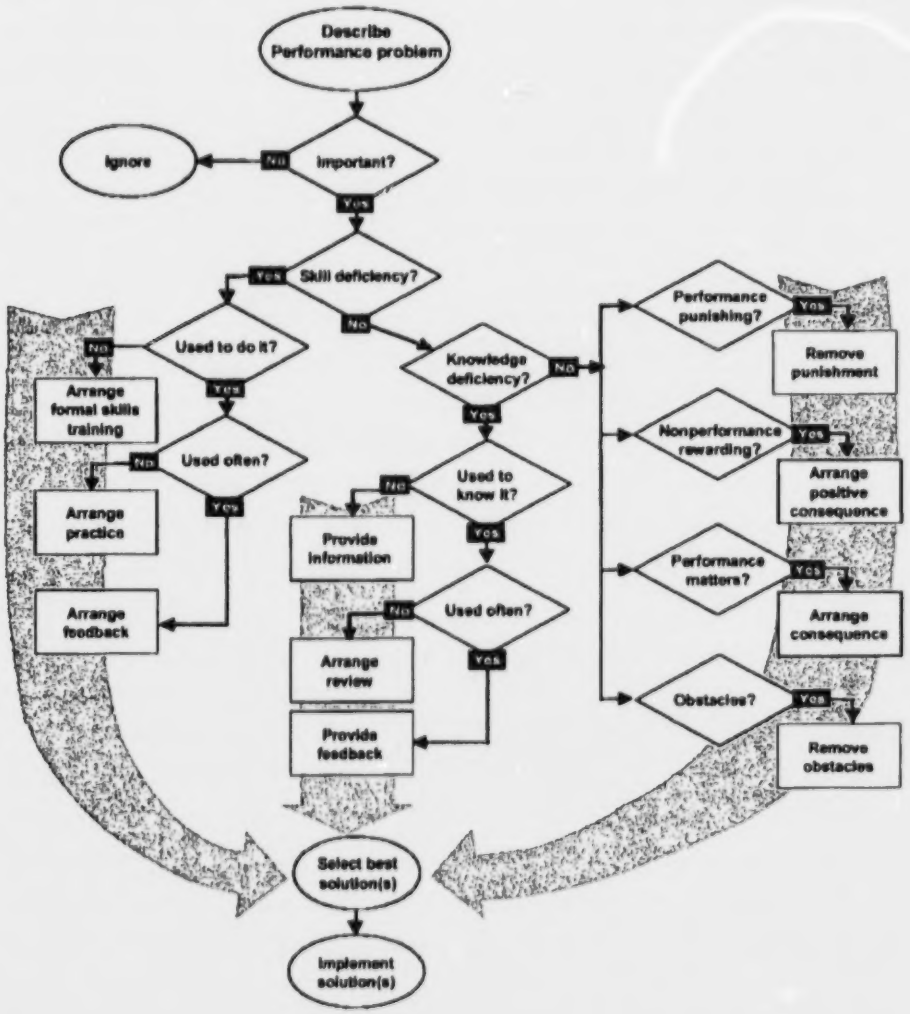

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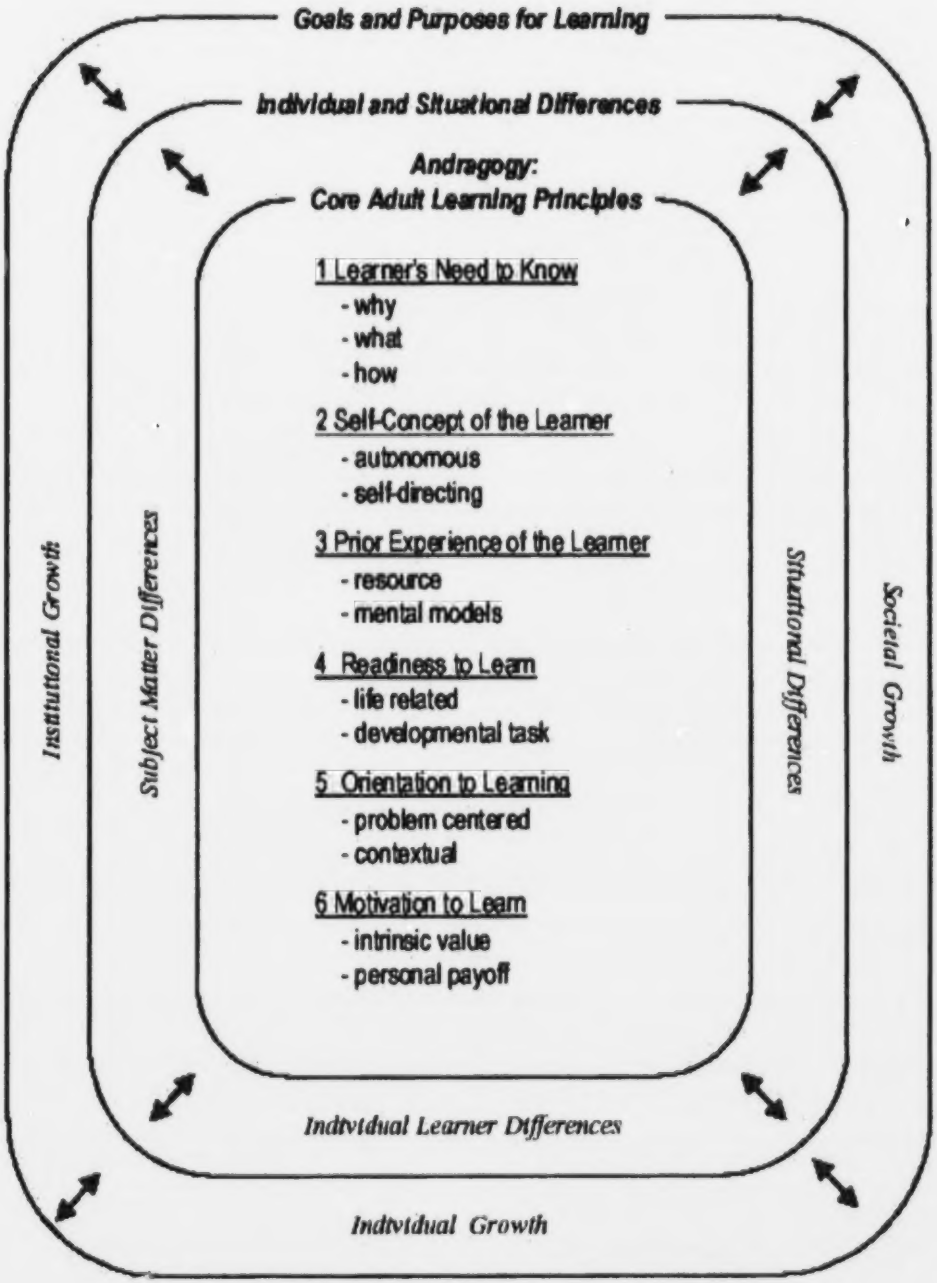
Figure 2. Andragogy in Practice Model



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Besides the andragogical model of adult learning, Gagne's nine events of instruction is also considered a systematic approach to instructional design and training. It focuses on training outcomes and behaviors through a nine-step process called the Events of Instruction (Gagne & Medsker, 1996), which correlate to and address the conditions of learning. The Events of Instruction are:

1) *Gain attention.* TBT can apply multimedia programs to increase a learner's attention. In addition, providing clear benefits and objectives at the beginning of the training session also attracts the learner interest.
2) *Inform learners of objectives.* In this step, Mager (1997) suggested that objectives be related to intended outcomes, and also that they be specific, measurable, and concerned with learners, not instructors. The objectives initiate the internal process of expectancy and help motivate the learner to complete the training.
3) *Stimulate recall of prior learning.* Kruse & Keil (1999) proposed a simple method through which instructors may ask questions about previous experiences, about understanding of previous concepts, or about a body of content. Therefore, learners can easily associate new information with prior knowledge to facilitate the learning process.
4) *Present the content.* When a new content is going to be presented to learners, the instructor needs to address it in a meaningful and organized manner so learners are not confused and lost. TBT can present screen images captured from the live application software and audio narration before a demonstration is performed.
5) *Provide learning guidance.* Examples and case studies can be presented before a learner enters a new course to provide guidance about the logic of new knowledge and skills.
6) *Elicit performance (practice).* After a new concept or skill is learned, an exercise is appropriate for learners to practice. With a real operation, learners are able to understand the meaning of the concept or skill, then keep motivated to continue the learning experience.
7) *Provide feedback.* After practicing new concepts or skills, it is important to offer instant and direct feedback on learner performance. Feedback provides an opportunity for learners to confirm their correct understanding, and the concept repetition further increases their likelihood of retention (Kruse & Keil, 1999).
8) *Assess performance.* An assessment or exam is required for learners to understand the level of their mastery of new knowledge. The result can provide both instructors and learners with some idea of what they have completed, as well as what they still need to learn. Assessment would ensure that TBT has successfully transferred new knowledge.
9) *Enhance retention and transfer to the job.* Before TBT was widely used, the analysis phrase ensured that learners could practice their new knowledge or skills in their current positions. However, a following up evaluation is needed to obtain feedback about the TBT.

Compared to these two learning concepts, Knowles, Holton, and Swanson's andragogical model suggests how adults learn well before training, and Gagne and Medske's Events of Instruction offers directions as to how adults learns while training is delivered. HRD practitioners can combine both theoretical concepts into TBT to enhance the capabilities of instructional designers. In addition, reading trade magazine columns, such as *Business Week* and *PC Magazine*, is a straightforward way to gain basic information about technology and new ideas of delivery techniques.

Conclusions and Recommendations

Humans invent tools (e.g., hammer and axe), then machines (e.g., automobile and electric saw), and now, machines with technology (e.g., computer and cell phone). New technology develops almost as fast as our imaginations. While comparatively large computers displayed only black and white text a few years ago, today's large capacity machines provide exceptional audio, video, and graphics capabilities as the norm. All these inventions increase productivity. HRD connects humans and machines because HRD is concerned with human development and how to increase the capability to use machines efficiently and safely in order to improve job performance. Through rapidly growing technological development, many convenient organizational tools will also be created. TBT, a relatively new learning technology, was created with the advantages of more convenience, more reliability, and more efficiency than instructor-led training as a delivery method. TBT can be applied to decrease the amount of corporation budget previously spent on employees' turnover. Furthermore, effective TBT can also directly enhance both an organization's performance and competitive advantage. Therefore, TBT has grown rapidly in recent years, and may well become the major industrial training approach of the near future, one that can be accepted by learners with all kinds of learning styles.

However, to complete a TBT project requires many different fields of expertise to ensure success. HRD practitioners, in their role of instructional designer in TBT, possess the experience of completing gap-analysis and the background of adult learning theories that play an active role in a TBT project. The literature identified that an excellent practitioner in TBT has basic knowledge of technology so s/he can easily apply contemporary technology into practice. This paper suggests that reading columns from PC Magazine and Business Week is an effortless way to obtain sensitivity about today's technology.

With unlimited horizons in technology development, TBT also has boundless development abilities in all kinds of subjects such as general orientation training program or specific leadership training programs. More research is needed to explore the effectiveness of TBT. For example, further research can be conducted to compare TBT and instructor-led training in the same subject, such as train-the-trainer, to examine the limitations or increase the creditability of TBT. In addition, case study in TBT is extremely valuable to develop further learning theories with new instructions and environments.

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Recurrent Themes in E-Learning: A Meta-Analysis of Major E-Learning Reports

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A meta-analysis of 15 major e-Learning reports provides a basic insight on what government, business, and professional organizations are saying about e-Learning. Findings, though basic, look at the purpose of the e-Learning reports, features of e-Learning and the trends affecting e-Learning.

Keyword: E-Learning, Policy Reports, Meta-analysis

E-Learning sometimes referred to as online learning, web-based learning, distance learning and technology-based learning, among other names, is a concept that has garnered significant global attention (Gotschall, 2000; Hall, 1997). Though the history of e-Learning (primarily distance learning) dates to the early 1950's and even before (Saba, 1999; Clark, 2000; Rosenberg, 2001), not until the last eight years has it become a momentous, collective imperative of several entities. This broad attention to e-Learning has resulted in numerous e-Learning reports. In doing extensive web searches for e-Learning reports, the researchers estimate that more than 250 e-Learning reports, excluding white papers, have been released worldwide over the last three years; by governments, business, academia and professional associations.

Problem Statement

The significance and relevance of technology and education has gained momentum; research on e-Learning is imperative. The discourse on e-Learning has focused on topics such as the effectiveness of e-Learning (Strommen & Lincoln, 1992; Harasim, Hiltz, Teles, & Turoff 1996; Webster, & Hackley, 1997), evaluation of distance education (Magalhaes, & Schiel, 1997; Thomas, 2000; Clark, 2000), e-Learning issues (Jonassen, 1992; Sherry, 1995; Banas & Emory, 1998), comparison of traditional and online learning (Saba, 1998; Ponzurick, France, Russo, & Cyril, 2000), and learning needs of organizations and their human resources amidst the technological, social and economical forces affecting the world (Gotschall, 2000; Karon, 2000; Wentling, Waight, King, 2002). Though not exclusive, and with little synthesis existing among these topics, the importance and challenges of e-Learning is omni-present.

With e-Learning being a huge imperative for government, business, and professional associations, and with these institutions being major players in the advancement of e-Learning, it is important to be cognizant of and synthesize what these institutions purport about e-Learning. These institutions have published various reports, their common discourse on e-Learning, however, is unknown. If government, business, and professional associations are leading the advancement of e-Learning, it is critical that there be cognizance on what these institutions say about the purpose, features and trends of e-Learning. This basic information can be the foundation to focusing research on e-Learning, a focus that is direly needed. Thus, this meta-analysis of e-Learning reports focuses on the following questions: (1) What is the purpose of e-Learning reports?; (2) What are features of e-Learning?; (3) What are the trends affecting e-Learning?

Conceptual Background

E-Learning is the acquisition and use of knowledge distributed and facilitated primarily by electronic means. This form of learning currently depends on networks and computers but will likely evolve into systems consisting of a variety of channels (e.g., wireless, satellite), and technologies (e.g., cellular phones, PDA's) as they are developed and adopted. Elearning can take the form of courses as well as modules and smaller learning objects. Elearning may incorporate synchronous or asynchronous access and may be distributed geographically with varied limits of time (Wentling, Waight and Kanfer, 2000).

The history of the technological revolution reveals that of all the sectors of society, education remains at the bottom of scale when it comes to integrating information technology (Strommen & Lincoln, 1992). The initial slow integration of technology into education can be a derivative of the early visions of distance education.

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Matthews (1999) indicated distance education was first and foremost a movement that sought not so much to challenge or change the structure of higher learning, but to extend the traditional university and to overcome inherent problems of scarcity and exclusivity.

As we move into the 21st century this vision of distance learning has changed as the delivery of education now extends to commercial centers. Along with personal productivity software, windows environments, local area networks, client server computing, internets, intranets, and extranets has come the introduction of personal digital assistants (PDA), and mobile and wireless technologies. These technological advances have enabled electronic commerce systems, anytime, anyplace data retrieval and updating, education, professional development, and the rapid growth of e-Learning (Wentling, Waight & King, 2002; Close, Humphreys, Ruttenbur 2000; Webster & Hackley, 1997).

As the integration of technology and education becomes addressed and as innovative information technology continues to surprise us, it is critical that a systemic approach to the organizational, process and individual (Rummler & Brache, 1992) issues such as insufficient empirical research, minimal application of research to practice, and application of traditional instructional design and teaching methods need to be addressed. In addition, the ineffective use of technology, the absence of the learner in the instructional design, antiquated policy; intellectual property and inadequate online teacher training are other issues affecting the effective integration of technology and education. Swanson (1999) related that, a wide range of systemic disconnects adversely affect performance. McNamarra (2001) related, 'a system is a collection of part unified to accomplish an overall goal. If one part of the system is removed, the nature of the system is changed as well'. (p.1). Cognizance that there are multiple factors that need concerted, consistent attention, is crucial, if e-Learning is to move from promise to practice. Learning and performance need to be seen, by every organization that implements e-learning, as outcomes of all the resources that go into any e-Learning effort. A strong partnership needs to be recognized and realized among all individuals and institutions involved in e-Learning.

At present, the systemic disconnects run across four main institutions: they are: government, business, academia and professional associations. Very few studies, for example, capitalize, extend or review existing research studies. Even more so, very few studies, move from research to practice. Thus, e-Learning continues to be plagued by learner, faculty and administrative issues. The issue of learner interaction, for example, has been researched in various but limited contexts (Webster & Hackley, 1997; Sherry, 1995; Ponzurich, France, Russo and Cyril, 2000; Thomas, 2000; Moore & Thompson, 1990, 1997). E-Learning reports, another example, are growing in number, however we do not know is what is in common across these reports.

Simply stated, there is presently a flurry of e-Learning research projects – few, if any, however, are making an impact on practice. Systems theory as a philosophy and systemic approach as a method for the government, business, academia and professional associations in their e-Learning efforts could start to bring changes in how we approach research and development of e-Learning.

Methodology

This study is the first part of a three-phase research project on e-Learning. The phases are: 1) identify e-Learning themes, 2) understanding the social, economic and research dimensions of e-learning, and 3) comparing themes between US and European e-Learning reports. The purpose of the first phase of the project, that is reported herein, is to identify the recurrent e-Learning themes. This is a qualitative study that intended to explore themes in the e-Learning reports. The major method of data collection was web searches using Metacrawler, Yahoo, Google and Lycos as the search engines. The reports provide rich descriptions (qualitative data). The qualitative data were content analyzed to provide recurrent themes. Content analysis is a research technique for systematically examining the content of communications, in this case, the e-Learning reports (Gall, Borg, & Gall, 1996).

Selection of Reports

A three-year span (1999-2001) was chosen to select the most recent and most cited public e-Learning reports published in the United States. Reports in this study do not include white papers, or research articles; they represent reports written by a group or organization. The rationale for choosing the most recent and most cited reports is that to identify the common denominator in the e-Learning reports. The reports used in the analysis needed to have some sort of impact on the knowledge base in e-Learning. Thus, the reports most commonly cited were considered significant and these reports were generally the most recent.

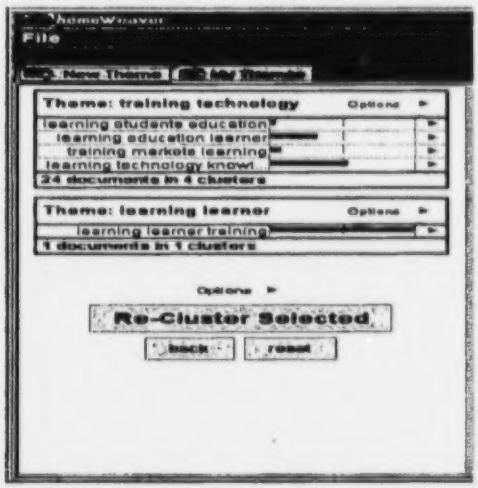
To identify the e-Learning reports, the researchers searched the web extensively using Metacrawler, Yahoo, Google, and Lycos. Understanding the dynamic nature of the web, an estimated 250 e-Learning reports were published world wide from 1999 to 2001. Of these 250 reports at least 100 were published and are presently sold by private companies for prices between 100 and 3000 dollars. Of the remaining 150 at least 70 reports were published outside of the United States. The researchers reviewed research articles, white papers, and e-Learning portals to identify which among the remaining 80 reports were the most cited reports. Fifteen (15) reports were the most recurrent and their sources were government, business and professional associations. These 15 reports altogether contained 1169 pages.

Analysis of Reports

The first level of analysis involved reviewing the first three pages of the reports for their sources. Second, the researchers reviewed the reports for keyword and phrases by using 'Theme Weaver', content analysis software, developed by the Automated Learning Group at National Center for Supercomputing Applications. Following is a description of 'Theme Weaver' that provides a description of how the analysis was done.

Some of the keywords that Theme Weaver produced were: training technology, learning learner, information, workers work, time technology, technology learning, training time, work user learning, performance learning technology, learning market, and education training technology, time products, future individuals, project products, learner business, time knowledge work, and adult economy policy, and knowledge people organizations.

The following shows the theme results of one search using Theme Weaver.



Third, the researchers used the 'NVivo', a qualitative software tool, to further understand the keywords produced by 'Theme Weaver'. NVivo produced the specific paragraphs were the keywords appeared in the reports. The researchers then reviewed the paragraphs to understand the context of the keywords and phrases. This review led to the identification of the research questions:

1. What is the purpose of e-Learning reports?
2. What are features of e-Learning?
3. What are the trends affecting e-Learning?

The fourth level of analysis was content analysis of the reports using the research questions as keywords. The researchers reviewed each report consecutively by research question. Content analysis is a research technique for systematically examining the content of communications–in this instance, the reports. Emergent themes were ranked by their frequency of mention and were ultimately categorized. Essentially, the study used a qualitative approach to analyze the responses. A quantitative method in the form of frequencies and percentages supported the

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qualitative data. The qualitative method was considered an appropriate way to explore the reports because of its descriptive nature to understand the whole of an event through insight and discovery (Bogdan & Biklen, 1992).

Results

The total number of reports analyzed was 15. The reports' sources were four government, seven businesses, and four professional training and development associations. The following are a description of reports and their sources.

Government Reports

1. President's Information Technology Advisory Committee (February 2001) Using information technology to transform the way we learn. Report to the president. http://www.itrd.gov/pubs/pitac/pitac-ti-9feb01.pdf
2. US Department of Education (December 2000) e-Learning - Putting a world class education at the fingertips of all Children - http://www.ed.gov/Technology/elearning/index.html
3. Web based Education Commission (December 2000). The Power of the Internet for learning: Moving from Promise to Practice. http://interact.hpcnet.org/webcommission/index.htm#report
4. US Department of Labor (September 1999). Futurework - Trends and Challenges for Work in the 21st Century http://www.dol.gov/dol/asp/public/futurework/report.htm

Business Reports

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2. Wit Capital (August 1999) The e-Knowledge Industry. E-Knowledge – New ways to build the new economy http://www.witcapital.com/research/reports/eknow_19990811/eknow_990811.pdf
3. WRHambrecht+CO (March 2000). Corporate e-learning: Exploring a new frontier http://www.wrhambrecht.com/research/elearning/ir/ir_explore.pdf
4. Thomas Weisel Partners (January 2000). Riding the big waves http://www.masie.com/masie/researchreports/b2breport.pdf
5. Suntrust Equitable Securities (March 2000) E-learning and Knowledge Technology. http://www.masie.com/masie/researchreports/e-learn0.pdf
6. Morgan Keegan & Co (June 2000). The engine of the knowledge economy http://www.masie.com/masie/researchreports/elearning0700nate2.pdf
7. Merrill Lynch & Co April, 1999). Distributed Learning: Building Schools Without Walls. http://www.e-commerce.research.ml.com/30209833.PDF

Association Reports

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Research Question 1: What is the Purpose of E-Learning?

The analysis revealed six purposes among the 15 reports. The following table provides a description of the themes and their frequency.

Table 1. *Purpose*

No.	Themes	N =15	%	G	B	PA
1	Inform (help) investors about e-Learning opportunities	7	46.6		7	
2	Discuss learning, the workforce and the workplace	5	33.3	1	1	3
3	Inform policy makers, educators, employers, and the public about e-Learning	4	26.6	4		

4	Identify the key drivers/players of e-Learning	4	26.6		4	
5	Discuss the contribution of technology to learning and performance	4	26.6	1	2	1
6	Identify major trends and winning strategies	3	20		3	1

G- Government, B- Business, PA - Professional Association

Upon reviewing the reports, the most recurrent purpose was to inform investors about e-Learning opportunities. The seven business reports provided detailed descriptive business models to inform investors of the strengths and weaknesses of the e-Learning market. The second most recurrent purpose was on learning, workforce and workplace. Five reports provide an in-depth picture of the changing nature of the learning, the workforce and workplace and how eLearning positions itself in this change. Looking at informing policy makers, educators, employers and the public, this purpose was found in all the government reports. Overall, associations' reports looked at the workforce and workplace, while business dealt with the investment opportunities, and government paid more attention to the policy makers, educators, employers and the public at large. Concertedly, however, 'learning, workforce and workplace' and 'discuss the contribution of technology to learning' purposes were dealt with by government, business and professional associations.

Research Question 2: What are the Features of E-Learning?

The analysis revealed 9 major features of e-Learning among the 15 reports. The following table provides a description of the themes and their frequency.

Table 2 . *Features*

No.	Themes	N =15	%	G	B	PA
1	Anytime, anywhere	15	100	4	7	4
2	Cost effective	15	100	4	7	4
3	Reach global customers	15	100	4	7	4
4	Just-in-time access to needed knowledge	15	100	4	7	4
5	Personalization	15	100	4	7	4
6	Improved collaboration and interactivity	15	100	4	7	4
7	Addresses learner diversity	11	80	4	5	2
8	Learner-centered	9	60	4	3	2
9	Working and learning lines blur	7	46.6	1	4	2

G- Government, B- Business, PA - Professional Association

Of all the research questions, the most recurrent themes surfaced in question 2. Six features of e-Learning were identified in all 15 reports. This communicates that the government, business and professional associations see e-Learning being anytime, anywhere, cost effective, have a global reach, be just-in-time, allow personalization and improve collaboration and interactivity. All these descriptors tell of a vision on integrating technology into education and how learning and performance can be facilitated. Learner diversity, identified 11 times, was seen as a major breakthrough for e-Learning because of technology that could be used to support e-Learning. Learner diversity included but was not exclusive to learning styles, location, experience, skills, language and learning pace. Of the nine reports that identified the learner-centered feature, the government reports were unanimous while of the seven reports that cited the lines of working and learning disappearing, four of the seven business reports were unanimous on this issue.

Research Question 3: What are the Trends Affecting E-Learning?

The analysis revealed that 20 trends were recurrent in the 15 reports. The following table provides a description of the themes and their frequency.

Table 3 . *Trends*

No.	Themes	N =15	%	G	B	PA
1	Lifelong learning	15	100	4	7	4
2	Improvements in technology	15	100	4	7	4
3	Demand for high level skill workers	15	100	4	7	4
4	Pervasiveness of computers	15	100	4	7	4
5	Globalization	15	100	4	7	4
6	New technologies bring new way of learning	15	100	4	7	4
7	Technology will improve the quality of learning	15	100	4	7	4
8	A way of sustaining and maintaining the human capital in the knowledge economy	12	80	3	6	3
9	Innovative business models that can attract investment in the technology-based instructional materials and methods	10	66.6	1	7	2
10	Public and private partnerships will be a major requirement	9	60	3	4	2
11	e-Learning market is growing	9	60	1	7	1
12	A core educational experience	9	60	4	3	2
13	Shortening product development cycle	7	46.6		7	
14	Corporations the fastest to explore and adopt e-Learning at a large scale	4	26.6		4	
15	Corporations the fastest to explore and adopt e-Learning at a large scale	4	26.6		4	
16	e-Learning movement is strong in corporate learning	3	20		3	
17	Corporate universities are growing	3	20	1	1	1
18	Education is the only aspect of society least affected by technology	3	20	1	1	1
19	Accessibility to internet and e-Learning may not be as wide spread in disadvantaged areas	3	20	2		1
20	Branding of content	2	13.3		2	

G- Government, B- Business, PA- Professional Association

Seven trends appeared in all 15 reports. These trends all capitalize on technology, education, the human capital and the intertwined impact of these three. E-Learning was also identified in 12 reports as a mechanism for sustaining the growth of the intellectual capital while 10 reports cited the introduction of business models on e-Learning by investors. Along this topic the growth of the e-Learning market, the need for private and public partnerships and e-Learning becoming a core educational experience were mentioned in nine reports. That corporate universities are growing and that education has been the least affected by technology were cited by one report from each source. Overall, the trends show that e-Learning is moving forward and that the business as well as the education aspects holds promise.

Discussion and Conclusion

The content analysis of the 15 reports revealed basic but significant information. Though, the results from this study touches the tip of the e-Learning iceberg, it holds significance for many professionals researching or writing about e-Learning. In essence this basic study gives educators, researchers and developers from all institutions a quick glance into the recurrent themes of 1169 pages of e-Learning reports. Given that the study is in its first stage, the study provided a peripheral insight into the purpose, e-Learning features and trends of 15 reports. The second part of this study will focus on the economic, social, research and development, learning organization and futuristic case of e-

Learning as purported by the reports government, business, and professional associations. The last part of the study will compare U.S and European reports on their purpose, feature and trends.

From this part of the study, it can be concluded that the government, business and professional associations converge in many aspects of e-Learning. The integration of education and technology, though presently lagging behind other aspects of society, will get better as technology improves and leaders in private and public institutions create partnerships to integrate technology into their education programs to improve learning and performance. Learning and performance are outcomes of eLearning that hold promise given the features of eLearning. The learner will have control of the learning; a model that has been found to be the best in an online environment (Jonassen, 1992; Harasim, Hiltz, Teles, Turoff, 1996). The just-in-time, anywhere, anytime capabilities will be topped off by the opportunities for collaboration, interactivity and personalization. All reports purport an agreement that a paradigm shift in the way education is viewed and delivered has occurred. In essence the perceptions of learning have undergone radical change (Rosenberg, 2001).

Therefore, as business organizations discuss the growing markets of e-Learning and develop business models to attract investors, the government targets policy makers, educators, employers and the public at large, while professionals organizations mainly focus on the workforce and workplace, it is imperative that all three entities become aware of their convergences and divergences. As Banas and Emory, (1998) stated, "while there is a growing recognition of and attention to distance learning in higher education, its growing inclusion in academia significantly changes the educational environment and experience. These changes need to be acknowledged and discussed by all stakeholders". (p.5) This study opens the door to the second phase of this research which is getting the detail on how technology will bring a new way of learning, how technology will improve the quality of learning, how e-Learning will sustain and maintain the intellectual capital and address learner diversity. Addressing learner diversity is critical because as Cifuentes and Murphy (2000) related, "in order to strengthen bonds among the members of expanding learning communities, administrators, teachers, and students in learner-centered schools and universities must honor diversity and emphasize the similarities that foster unity". (p.17). Overall, the themes revealed that there is a large consensus on the what, where, why and how of e-Learning. The next phase of this study is to understand the social, economic, research and development, learning organization and the futuristic case of e-Learning. .

Implications for HRD

The first implication of this study is for all HRD educators and researchers. With e-learning, a rapid, effective and less expensive form of training and development (Schutte, 1996, Magalhaes & Schiel, 1999; Karon, 2000), the study provides preliminary information that educators as well as researchers could use when writing grants, or conducting research on e-Learning. The findings are basic but help to build a foundation for e-Learning. The study also gives educators and researchers an insight into what the government, business and professional associations are saying about e-Learning.

The second implication of the study is for the HRD practitioners. This study gives practitioners a snap shot of the e-Learning features and trends to help anticipate the e-Learning scenario. Both features and trends are important when assessing the workplace and the workforce in its readiness for e-Learning. HRD practitioners need to know how these trends and features will modify their practice.

The third implication of this study is more research. This study though preliminary, in its findings, highlighted recurrent themes in purpose, features and trends across government, business and professional associations. Reports from academia were unexplored, a source that needs to be reviewed. Also, because of the newness of the topic, there are still many avenues to explore across government, business, education, and professional associations.

The last implication is for professionals directing government, business, academia, and professionals associations eLearning efforts. This study's preliminary findings show that there is overlap in their purposes, features and trends. It is important that each stakeholder be cognizant of each other's efforts in realizing e-Learning promise.

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